

University of Portland
ME 421 – Failure Analysis
Fall 2013

1. The 1960's was decade of extreme risk and uncertainty to say the least. It would be a shame for college graduates to not have a good sense of the major events in that time period. Through Google, Wikipedia, or other such places, if you are not familiar with the following, spend a few minutes doing so. Be sure to watch the video's linked below. There is nothing to turn in for this (other than what is specified in problem 2). This is learning for learning's sake.

1957, October 4; Sputnik launched

1960, October 12; Cold War extremes: Khrushchev behavior at the United Nations. Watch:

http://www.youtube.com/watch?v=Mm0yQg1hS_w Yes, he really did pound on the table with his shoe with very inflammatory statements – extra credit for anyone sending me a link to video of the shoe pounding with English voice-over or subtitles.

1960, October 24; Nedelin catastrophe (not known about in the west until many years later).

1961, April 12; Vostok 1, Yuri Gagarin first man in space

1961, May 1; Alan Shepard became the first American in space with a 15 minute suborbital flight

1961, May 25; President Kennedy made an audacious statement to congress; probably *the most audacious* public statement ever made anywhere at any time. Watch the youtube video of this statement:

(<http://www.youtube.com/watch?v=TUXuV7XbZvU&feature=related>).

1961, April 17; Bay of Pigs invasion

1962, September 12; President Kennedy gave a talk at Rice University:

http://www.youtube.com/watch?v=FYb_mhiE-qU

1962, October; Cuban Missile Crisis

1963, November 22, John F. Kennedy assassinated

1967, January 27; America's first space related accident (known as Apollo 1 accident)

1968, April 4, Martin Luther King, Jr. assassinated

1968, June 6, Robert Kennedy assassinated

It's been a tough decade. The above events, the Vietnam Conflict, etc. It's time for some joy:

1968, December 24; Apollo 8 astronauts are the first humans to see the "dark side" of the moon. Listen to their words: <http://www.youtube.com/watch?v=njpWalYduU4> The top comment from this youtube expresses what I remember:

I was just turned 7, watching this on TV and it's still the coolest thing I ever watched. The first time we left the Earth and went to another place and the whole world was up there with them I still remember going outside after that, and looking at the Moon, and it was just a crescent and thinking how cool it was that there was people up there and that I was going to get presents tomorrow.

1969, July 16; Apollo 11 liftoff (watch this video, you probably have not seen this):

<http://www.youtube.com/watch?v=eB82KvuesQ>

1969, July 18; Chappaquiddick incident

1969, July 20; "That's one small step for man, one giant leap for mankind". Watch them land: <http://www.youtube.com/watch?v=qWbBbaqFvbk>

1969, December 31, 11:59PM – the "end of the decade" – JFK, we made it!

2. Okay, so now that you are familiar with a few events of the 1960's, answer the following, if you skipped some of the above, now is the time to unskip them:
 - a) What was the famous Khrushchev quote (or mis-quote) at the United Nations?
 - b) During his visit and infamous speech to the United Nations in 1960, Khrushchev was aware of what was occurring at Nedelin. What was occurring at Nedelin?
 - c) When President Kennedy gave his 1962 address at Rice University, was it a hot day or cold day? Very briefly justify your answer. Note: there is no real point to this question other than to encourage you to watch the historic video linked in "Problem 1."
 - d) Briefly (1 or 2 sentences), what was the Chappaquiddick incident?
3. Enough politics, on to technical stuff:
 - a) **Trying to ignore hindsight**, write one concise paragraph (~4 sentences) about how you would have voted (and why) if you were a member of congress asked at that time to financially support President Kennedy's May 1961 request. This does not have to be a highly researched answer.
 - b) **With hindsight**, explain in one concise paragraph why you think the decision to support this endeavor was or was not appropriate.
 - c) On 27 January 1967, less than three years before the end of the decade, the first manned Apollo rocket sat on the launch pad with three astronauts onboard. The training exercise was referred to as Apollo 204 – they were training for the first launch (Apollo 1). A fire broke out in the space capsule killing all three astronauts. A thorough investigation as to the cause of the accident was conducted and numerous changes resulted. Two of the more significant resulting changes were:
 - a) The capsule was redesigned to have a mixture of O₂ and N₂.
 - b) The hatch was redesigned to open outward (the inward opening hatch took many minutes to open – the astronauts would have to move around in the capsule to make room to open the hatch).

Skim through the review board report:

http://history.nasa.gov/SP-4029/Apollo_01a_Summary.htm

For each of these two changes (O₂ environment and hatch) discuss how these changes could have actually introduced greater risk rather than less risk. One concise paragraph for each – give this some thought. Were these two changes appropriate?